

Current Probe

(Order Code DCP-BTA)



The Current Probe is designed for exploring the basic principles of electricity. Use the Current Probe to measure currents in low voltage AC and DC circuits. With a range of ± 0.6 A, this system is ideal for use in most “battery and bulb” circuits. Use it with the Differential Voltage Probe (order code DVP-BTA) to explore Ohm’s law, phase relationships in reactive components, and much more. Use multiple sensors to explore series and parallel circuits. It can also be used in electrochemistry experiments. This sensor has the same characteristics as the Current Sensor from the Vernier Current & Voltage Probe System.

Using the Current Probe with a Computer

This sensor can be used with a Vernier LabPro[®] or Go!Link[®]. Follow these general procedures to use the Current Probe with a computer:

1. Connect the Current Probe to Channel 1 on the interface or to a Go!Link.
2. Start Logger *Pro*[®] or Logger Lite[®] on the computer.
3. You are now ready to collect data¹. Logger *Pro* or Logger Lite will identify the Current Probe and load a calibration. Click on Collect and begin collecting data.

Using the Current Probe with TI Graphing Calculators

This sensor can be used with a TI graphing calculator and any of the following lab interfaces: LabPro, CBL 2, or the original CBL system. Follow these general procedures to use the Current Probe with a graphing calculator:

1. Using LabPro or CBL 2 and the DataMate program:
 - a. Connect the TI graphing calculator, interface, and Current Probe.
 - b. Start DataMate, and the Current Probe will be identified automatically.
 - c. You are now ready to collect data.
2. Using the original CBL and the PHYSICS program:
 - a. Connect the TI graphing calculator, interface, and Current Probe.
 - b. Start PHYSICS. Note: If the date on the opening screen is older than September 2002, you will need to download a newer version from www.vernier.com.
 - c. Choose SETUP PROBES and choose ONE.
 - d. Use the calibration for the current probe that is part of the Current & Voltage Probe System (C-V CURRENT).

Using the Current Probe with Palm Powered™ Handhelds

This sensor can be used with a Palm Powered handheld and the LabPro.

1. Connect the Palm Powered handheld, LabPro, and the Current Probe.
2. Start Data Pro.
3. Tap New, or choose New from the Data Pro menu. Tap New again. The Current Probe will be identified automatically.
4. You are now ready to collect data.

Specifications

Current Probe range: ± 0.6 A

Maximum voltage on any input: ± 10 V

Input Impedance (between inputs): 0.1Ω

Input Impedance (to ground): $10 \text{ M}\Omega$

Linearity: 0.01%

Resolution (using LabPro, Go!Link, ULI II, SBI): 0.31 mA

Resolution (using ULI, CBL, CBL 2): 1.25 mA

Supply voltage: 5 VDC

Supply current (typical): 9 mA

Output voltage range: 0 – 5 V

Transfer function: $V_{\text{out}} = -4(I) + 2.5$

This sensor is equipped with circuitry that supports auto-ID. When used with LabPro, Go! Link, or CBL 2, the data collection software identifies the sensor and uses pre-defined parameters to configure an experiment appropriate to the recognized sensor. This greatly simplifies the set-up procedures for any experiments. Auto-ID is required for the Quick Setup feature of LabPro and CBL 2.

How the Current Probe Works

The Current Probe contains a sensing element and signal conditioning amplifier. The sensing element is a 0.1Ω resistor connected between the red and black terminals. As the current passes through the resistor, a small potential difference can be measured across this resistor. This potential difference is input to the signal conditioning amplifier. The final result is that a voltage is produced from the amplifier that can be measured by the lab interface. This voltage varies in a linear way with the current through the Current Probe, as given in the transfer function above.

The current probes were designed to look like they should be wired in series with the circuit. Currents in either direction can be measured. The current will be indicated as positive if current flows in the direction of the arrow on the small box (from the red terminal to the black terminal). The range is ± 0.6 A (± 600 mA).

¹ If your system does not support auto-ID, open an experiment file in Logger *Pro*, and you are ready to collect data.

Do I need to calibrate the Current Probe? “No”

We feel that you should not have to perform a new calibration when using the Current Probe in the classroom. We have set the sensor to match our stored calibration before shipping it. You can simply use the appropriate calibration file that is stored in your data-collection program from Vernier in any of these ways:

1. If you are using the Current Probe with a LabPro, Go!Link, or CBL 2 interface, then a calibration is automatically loaded when the Current Probe is detected.
2. If you manually load an experiment or calibration file, choose the Current & Voltage Probe System. The calibration for the Current Probe is the same as for the current probe in this older system.
3. Any version of the DataMate program (with LabPro or CBL 2) will automatically identify this sensor. DataMate also has stored calibrations for this sensor (use the Current & Voltage Probe Current Sensor).
4. Any version of the PHYSICS program (for CBL), version 9/09/02 or newer, has stored calibrations for this. Go to our web site, www.vernier.com, to download a most recent version. Use the calibration for the current probe that is part of the Current & Voltage Probe System (C-V CURRENT).

The output of this system is linear with respect to the measurement it is making. As mentioned before, the amplifier allows you to measure positive and negative currents on any of our interfaces. Since many lab interfaces can read voltages only in the range of 0 to 5 volts, the amplifier offsets and amplifies the incoming signal so that the output is always in the range of 0 to 5 volts. If an input is zero amperes, for example, the amplifier will produce an output of 2.5 volts. The output varies from this 2.5 volt level, depending on the input. To collect data as current, use either the calibration supplied with your program, or calibrate the unit using known currents. A standard, two-point calibration is done, as with any Vernier sensor. (An alternative to this two-point calibration is to “zero” the sensor.) This can be done by shorting out the leads of the sensor, then choosing the Zero option in the data-collection software. This option adjusts the calibration offset but does not adjust the calibration gain.

The default calibration slopes and intercepts for these sensors are:

Current in amperes:

Slope: -0.25 A/V

Intercept: 0.625 A

Warranty

Vernier warrants this product to be free from defects in materials and workmanship for a period of five years from the date of shipment to the customer. This warranty does not cover damage to the product caused by abuse or improper use.



Measure. Analyze. Learn.™

Vernier Software & Technology

13979 S.W. Millikan Way • Beaverton, OR 97005-2886

Toll Free (888) 837-6437 • (503) 277-2299 • FAX (503) 277-2440

info@vernier.com • www.vernier.com

Rev.4/17/06

Logger Pro, Vernier LabPro, Go!Link and other marks shown are our registered trademarks in the United States.

CBL 2 and CBL, TI-GRAPH LINK, and TI Connect are trademarks of Texas Instruments.

All other marks not owned by us that appear herein are the property of their respective owners, who may or may not be affiliated with, connected to, or sponsored by us.



Printed on recycled paper.